## REMARKS

Background

The pending office action rejected the claims based on Clarke in view of CarnaudMetalbox and further in view of Schmalbach or purportedly admitted prior art from Applicant's specification. In the response dated December 9, 2002, Applicant has argued, first, that the prior art, as a whole, teaches away from the claimed configuration. For example, the primary reference (Clarke) states it is an object "to facilitate the use of larger size openings" and that a "'larger opening' is . . . in the range of approximately 0.5 to 0.75 square inch." (Clarke col. 2, lines 33-35 & 9-14). Accordingly, Clarke's express teaching relating to the "larger opening," *inter alia*, explicitly teaches away from an opening having an area of less than 0.5 square inches, as recited in Applicant's claim 1. Applicants also explain in the response of December 9, 2002 the inappropriateness of relying *only on the figures* of Schmalbach, as the office action apparently does, for asserting Schmalbach teaches any aspect ratio.

Applicant in the prior response has argued, second, that the claimed invention provides unexpectedly beneficial flow characteristics. The pending office action states that such arguments are not persuasive because, *inter alia*, the "prior art of embodiment A [of the graph] would have inherent characteristics as of the claimed invention, i.e. with larger radius to the side the opening would allow more air into the container and a better flow rate is obtained." The office action further states that although the teachings of the prior art "do not teach the flow rate, however, the flow rate characteristics are not being recited in the claims. Furthermore, the claimed ratio is specifically taught in these references and thus would **inherently** have the flow rate as claimed." (emphasis in original). Applicant herein traverses the rejection and the grounds on which it is based. In addition to the arguments submitted in Applicant's prior response, Applicant's inventive end produces better inrush characteristics when the effect of the size of the opening is taken into account, which characteristics constitute unexpected results.

Applicant Submits Additional Evidence Of Unexpected Results By Manipulating Data Already of Record

As explained in the enclosed second Declaration of Mr. Brian Fields, "flow characteristics upon initially rotating a container (as described on page 2, line 22, et seq., of the as-filed application) are important parameters in evaluating end performance. I believe the first peak of a graph of flow rate versus unit time is an important parameter that reflects inrush characteristics." (Fields Declaration, May 18, 2004, para. 6).

By manipulating the graphical results already of record, Applicant demonstrates unexpected results with respect to the flow characteristics: specifically, better inrush characteristics. In particular, the flow rate per unit area of an end having the claimed configuration has a first peak that is higher than the first peak of either conventional opening. In this regard, Applicant provides the attached new Graphs 1 and 2, which merely normalize each of the plots provided in Applicant's response dated December 9, 2002 (Exhibit 1 of December 9, 2002) by the opening area.

Specifically, the y-axis magnitudes of each plot of Exhibit 1 of December 9, 2002 are multiplied by the ratio of the opening area of the base end (that is, 0.450 sq. in.) to the opening area of the particular plot's end to produce the scale on the left side of the graph. For example, each of the y-axis magnitudes (using the scale on the left side of the graph) for the end of Plot D having an opening area of 0.487 sq. in. is multiplied 0.924 (that is, 0.450/0.487). (Fields Declaration, May 18, 2004, paras. 3 & 4). The scale on the right side of the attached Graphs 1 and 2 shows the data of Exhibit 1 of December 9, 2002 divided by the opening area of the particular end to produce y-axis magnitudes of flow rate per unit area. For example, each of the y-axis magnitudes (using the scale on the right side of the graph) for the end of plot D having an opening area of 0.487 sq. in. is divided by 0.487 sq. in. (Id.). The result is a plot of normalized flow rate on the y-axis versus unit time on the x-axis. Ignoring dimensions, the shape of the plots generally represent flow rate per unit area versus unit time. (Fields Declaration, May 18, 2004, para. 5).

The enclosed graph represents the flow characteristics for the following opening configurations:

| Plot | Color | Title | Opening Area ($in^2$) | Aspect Ratio |
|---|---|---|---|---|
| A | Pink | 202 LOE Normalized | 0.596* | 1.47 |
| B | Black | Std 202 .450 | 0.450 | 1.1* |
| C | Red | 202 SE LOE .450 | 0.450 | 1.61 |
| D | Blue | 202 SE LOE .487 Normalized | 0.487 | 1.51 |

* indicates a parameter that is outside the ranged claimed in the present application.

As shown in attached Graph 1, the magnitudes of the first peaks of normalized flow rate (or flow rate per unit area) are significantly higher for inventive ends C and D compared with peaks for the conventional ends A and B. Because a large magnitude peak generally corresponds to a beneficial inrush characteristic (Fields Declaration, May 18, 2004, para. 6), the high initial peak values of the inventive, claimed ends demonstrate that Applicant's solution achieves the result of enhancing flow characteristics through a relatively small opening. (Fields Declaration, May 18, 2004, para. 7).

Graph 2 is the same as graph 1, except the plot for conventional end B is omitted. The conventional end A (pink) has an aspect ratio of 1.47 and an opening area of 0.596 sq. in. Inventive end D, in contrast, has an aspect ratio of 1.51 and an opening area 0.487 sq. in. Ignoring the change in aspect ratio of ends A and D (the aspect ratio of opening A is only 2.7% smaller than that of end D), the larger opening area of conventional end A yields a decreased first peak in flow rate per unit area compared with that of end D. The peak of inventive end D is approximately 13% higher than the peak of conventional end A. The increased peak of flow rate per unit area of inventive end D is unexpected, and indicates an improved efficiency of flow. Such improved efficiency occurs in the inventive end having the claimed aspect ratio and an opening area below 0.5 sq. in., compared with a prior art end having a larger opening area.

The unexpected nature of the improved flow efficiency -- characterized by the initial flow rate peaks (that is, improved inrush characteristic) -- of Applicant's claimed ends is

evident from the examiner's own statements. The first office action states, regarding Applicant's arguments for patentability, "Mr. Fields's statement that the increase in flow rate is due to the geometry of the opening is absurd and contrary to the laws of physics. Manning's equation Q = VA dictates the rate of flow has a direct relationship on the area (A) and velocity (V)." (Office Action, February 27, 2003, page 4).

Despite the office action's true statement of hydrology, the attached graph indicates that Mr. Field's discovery is an improvement that is not easily predicted and is unexpected according to previously understood views in the field.

Because the graph provided herein is evidence of unexpected results, the pending claims are allowable regardless whether the flow characteristics are recited in the claims.

Applicant adds new claims 7 through 10, which further distinguish the claimed invention over the cited art. For example, clam 7 recites that the "end exhibits a higher first peak of flow rate per unit opening area compared with the first peak of flow rate per unit opening area of an end having an aspect ratio of 1.47 and an opening area of 0.596 square inches and compared with the first peak of flow rate per unit opening area of an end having an aspect ratio of 1.1 and an opening area of 0.450 square inches." Such claim and the other new claims are supported by the as-filed Figure 3 and page 8 of the specification. Contrary to the assertion in the office action, the prior art references do not inherently have the claimed flow characteristics, as the enclosed plots make clear.

## CONCLUSION

Applicant submits that the claims are in condition for allowance based, *inter alia*, on Applicant's evidence of unexpected results: improved inrush characteristics (after the variable of opening area is accounted for) and flow efficiency characterized by higher peak flow rates per unit area compared with conventional configurations. Accordingly, Applicants request favorable consideration. If the examiner determines that a telephone conversation would further the prosecution of this case, he is invited to telephone the undersigned at his convenience.

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